EXPLORING THE ROLE OF ENVIRONMENTAL RESEARCH AND SUSTAINABLE ECONOMIC NATIONAL DEVELOPMENT IN NIGERIA

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ABSTRACT

There are countless researches in diverse fields of study one of which is Environmental Science. This research directs notice to the role and evaluation of research toward relationship between environmental education and sustainable national development. This paper aims at showing how research in this science can be made relevant for national development. It reviews some of the researches on environmental pollution, environmental resources, environmental information resources, climate change and others. It was found out that researchers in environmental science can be made significant through placing precedence on research, adopting research recommendations, commercializing research, accessible environmental information resources, setting up miniature and average scale enterprises, enhanced technology etc. It is therefore recommended that recommendations of this paper be adopted to make environmental science relevant for national development in Nigeria. We argue that environment and development are intertwined and therefore must be systematically integrated into educational activities to produce environmentally accountable and responsible citizens and policies in the collective bid to achieve sustainable development.

Keywords: Environment, Environmental Problems, Environmental Education and Sustainable Development.

INTRODUCTION

The environmental sciences have recognized huge and troublesome changes in earth systems, from climate change and loss of biodiversity, to changes in hydrological and nutrient cycles and reduction of natural resources (Wikipedia 2010). Research is the exploration for knowledge or organized exploration with an open intelligence to establish novel facts usually using a scientific method (Wikipedia, 2010). Gumel (2008), defined research as a carefully study of a subject, especially in order to discover new facts or information about it. Research is a process of collecting information from your own facts, knowledgeable source and data from exploratory of basic research to a point where they can be exploited to meet a specific need. Researches are carried out in different fields of study one of which is environmental science. Environmental science provides an incorporated, quantitative and interdisciplinary advance to the study of environmental systems (Wikipedia, 2010b). Cunningham and Cunningham, (2006:4) defines environmental sciences as the systematic study of our environment and our place in it. A relatively new field, environmental science is highly interdisciplinary. It integrates information from biology, chemistry, geography, agriculture and many other fields. Environmental science also incorporates knowledge of social organizations, politics and the

humanities and applies it to improve the way we threat our environmental (Cunningham and Cunningham, 2006). National development on the other hand refers to improvement in the welfare and social well being of citizens in terms of the indicators of development experiments (Gumel, 2008). Gumel (2008:113) further explained that research can be either basic or applied Basic research can be defined as the work of scientists and others who pursue their investigation without conscious goals, other than the desire to unravel the secret of nature. Applied research causes of finding academic field that integrates physical and biological sciences (including physics, chemistry, biology, soil science, geology and geography) to the study of the environment and the solutions to environmental problems. As a process, national development implies the collective effort of a nation to harness, coordinate and utilise resources both human and natural for the improvement of life and living conditions of vast majority of people (Yantumaki, 2009). Research has an important relationship with development that is why research is often linked with development as R&D (Research and Development). This is so because the adoption of research findings often leads to development.

Development is essential and critical to growth and sustenance of any country. In order to successfully enhance meaningful development, effective strategies must be evolved. Here, we examine the trend of national development in Nigeria, and provides a workable method of approach to national development. The paper is further divided as follows: First, we introduce the study and clarifies some key concepts. Next, we look briefly at some attempted development strategies in Nigeria and the problems of national development; then we examine briefly models of development across Asian continent. Finally, the concluding aspect, provides recommendations based on the study of Asian model of development as a viable option for Nigerian national development aspirations. According to Yusuf (2005), "research as an indispensable avenue for finding solutions to Nigeria's social, economic and technological problems". It is based on this and the relationship between research and development that this paper aims at showing how to make research in environmental science relevant to national development in Nigeria.

RESEARCH IN ENVIRONMENTAL SCIENCE

There are lots of researches in environmental science in Nigeria. These researches are prepared in different areas of environmental science such as waste supervision, environmental contamination, resource conservation and depletion, rapid population growth, and urbanization, climate alteration, nature-based tourism etc (Ladan, 2011). Some of these researches are reviewed and presented here.

Waste supervision: Ogwuleka (2009), made a comprehensive research on municipal solid waste uniqueness and supervision in Nigeria. In the study, nine cities namely Port-Harcourt, Maiduguri, Kano, Ibadan, Makurdi,, Onitsha, Lagos, Nsukka and Abuja were selected as urbanistic representatives of the current solid waste management in Nigeria. The study found that waste characteristics vary according to season, income level, population, social behaviour, climate and industrial development. The study reveals that great majority of the total solid waste generated in Nigeria is organic in nature(Ladan, 2011). The open dumps provide harbourage for disease carrying organisms, bacteria, insects and rodents. Government agencies have failed to provide adequate services as there is inadequate service coverage in most urban areas (Ogwuleka, 2009). Dung Gwon and Magaji (2007), research study, found out that even in the Federal Capital Territory, there are environmental health problems associated with solid waste management. Result show that the dumped solid waste contained disease vectors which were quite harmful to humans and the environment that people live in.

ENVIRONMENTAL CONTAMINATION

Bashir and Kawo (2004), in their study indicated that environmental contamination problems are many resulting in long term dilapidation and increase in the prevalence of water-borne diseases. Ibrahim and Abdullahi (2004), in their study on industrial pollution centered in Lagos, Port-Harcourt, Kano and Kaduna found evidences of atmospheric pollution around industrial areas. In these locations, there are lots of gases released into the atmosphere from the neighboring industries resulting in severe atmospheric contamination. The result is lots of health problems like cancer, asthma, eye irritation, choking of throat and general body distress which are rampant (Ibrahim and Abdullahi, 2004). In a study on urban environmental quality, Ladan (2007, found out that the atmosphere in urban centres like Katsina is subjected to unusual emissions which comes from motor vehicles and motor cycles, flaming of refuse and wood for cooking. This pollution creates breathing difficulties for people with respiratory diseases (Ladan, 2007). Kperebeyi et al., (2005), studied the impacts of oil spoilage and gas flares pollution on agricultural productivity and farmers. The results showed that farmers have been experiencing decrease in agricultural productivity and subsistence farming due to lack of arable farming land caused by the pollution. The impacts lead to rural unemployment which cause youth restiveness, oil pipeline vandalization, crime and lawlessness (Kperebeyi et al., 2005).

ENVIRONMENTAL RESOURCES

Bisong (2007), in his study on deforestation in the rain forest of South Eastern Nigeria accomplished that the rate of deforestation in the Cross River high forest is unfavorable to the immediate and long term preservation of forest and biodiversity. Similarly Yilwa (2007), in his assessment of wood handling has found out that most of the forest/savanna vegetation in the Middle Belt have been exploited, as wood has remained a dominant source of energy. The result is that there are few remaining areas of forests leading to depletion of forest resources. The situation concerning forest resources is so bad that even gazetted forest reserves were not spared. Ladan (2011) undertook a study on an examination of the status of forest reserves in Katsina metropolis, Katsina state. The author noted with dismay the recent degradation of forest reserves around the urban centre. This has resulted in visual and physical degradation, increase in hazards, and loss of wind breakers, loss of raw-materials and economic loss (Ladan, 2011). In terms of water resources, there are many researches in different urban centers in the country have shown that there is the pollution of water bodies such as ponds, streams, rivers from the discharge of industrial effluents by industries located around the urban centers. Dan Azumi and Bichi (2010), study analyzed the effects of heavy metal discharge from industrial effluents on River Challawa in Kano and found out that the discharge has exceeded the maximum permissible limit given by the Federal Environmental Protection Agency. Municipal wastes and sewage are also discharged into receiving water bodies without treatment. The consequence of this is increased river pollution, loss of aquatic life and uptake of polluted water by plants and animals which eventually gets into human body resulting in health related problems (Dan-Azumi and Bichi, 2010). The exploitation of mineral resources have caused different types of environmental damage, Aigbedion and Iyayi (2007), found out that the damages include ecological disturbance, destruction of natural flora and fauna, pollution of land, air and water, instability of soil and rock masses, landscape degradation and radiation hazards. The environmental damages in turn resulted in waste of arable land, as well as economic crops and trees (Aigbedion and Iyayi, 2007).

CLIMATE ALTERATION

Climate alteration is now a serious environmental issue in the world affecting different countries including Nigeria. Ayuba et al., (2007) examines climate change impacts on six-arid range lands of north- eastern Nigeria. The results reveals declining forage, specie composition,

increased bare surfaces and increased shrub encroachment which are indications of combined effects of grazing, fire, drought, desertification and climate variability. Barau (2007), appraise climate change risks in Kano state. The study found out that climate change constitutes multiple threats to Kano state. The key risks are in the agricultural systems, the riverine and dam neighbouring communities, the health sector, transportation and aviation sector, and urban habitat among others (Ladan, 2011). However, it was found out that only two of the five institutions sampled for the study are working towards adopting climate change risks.

POPULATION GROWTH, URBANIZATION AND THE ENVIRONMENT

Nigeria has been experience rapid growth of its population. For example, in 1991 the National Population Census gave the population as 88,514,501, this figure rose to 140,003,542 with a growth rate of 3.2% (Ladan, 2008). This rapid growth has an impact on the environment. Study by Ladan (2008), has shown that the impacts are negative in the areas of resource depletion, deforestation, desertification, loss of diversity, disappearance of open space, increased pollution etc. Even though urbanization is a welcomed development, it was achieved at a heavy environmental cost in Nigeria. Ruma (2009), study on Katsina urban area, Katsina State has found out that residential development is taking place in environmentally sensitive areas (such as wetlands, marshlands, flood plains etc) on proposed roads, drainage lines and in waste dumps(Ladan, 2011). Furthermore, the rate at which agricultural land around the urban center is being converted to residential use is high (Ruma, 2009). Many studies have shown that there is a high positive correlation btween the process of urbanization and the degradation of the environment. This can be attributed to clearance for urban constructions works and fuel wood harvesting around urban centers.

HOW TO MAKE RESEARCH IN ENVIRONMENTAL SCIENCE RELEVANT TO NATIONAL DEVELOPMENT

There are several ways by which research in environmental science can be made relevant for the nation's development. This can be through:

PLACING PRIORITY ON RESEARCH

Researches in environmental science can be made relevant for national development by placing priority on them. This can be through adequate funding and motivation to environmental scientists to carry out their research activities. The government has the responsibility of funding research, as the private sector in Nigeria are not yet matured to take risk and invest in research (Ikuforiji,2009). The government can release money through National Universities Commission (NUC) and National Board for Technical Education (NBTE) that can be used for funding of researches in Universities and Polytechnics. Adequate funding is central to solving the research problem and the problem of funding has greatly hampered research (Yusuf, 2005).

ADOPTING RESEARCH RECOMMENDATIONS

Researches in environmental science such as those highlighted earlier usually made recommendations based on their funding. These recommendations should be adopted and implemented by the government. This is one of the ways to make researches relevant for national development. For example, Bamidele et al (2005) recommended recycling synthetic materials as a way of reducing the menace of municipal/urban wastes. Many researches such as Yilwa, (2007), have recommended adoption of alternative sources of energy to replace the use of fuel wood as a means of conserving forest resources, and contributing to a clearer and better environment people are living. Donald (2005), in his study on ecotourism have recommended the development of nature based tourism resources to provide income and employment for the people and earn the nation the much needed foreign exchange.

COMMERCIALIZATION OF RESEARCH RESULT

In order for research in environmental science to be relevant to national development, they have to be commercialized. (Ladan, 2011)have found out that there can be bioconversion of biodegradable (bio waste) component into organic fertilizer and biogas Naron and Aminu (2009), investigates the usefulness of agro-waste such as rice husk, saw dust, sugar cane waste and groundnut shells as an alternative fuel for household energy. The commercialization of these kinds of researches will boost the production of fertilizer and provide biogas which serve as an alternative source of energy. Thus commercializing research will give the findings economic value and provide new products that can be used for further production e.g. fertilizer for food production.

SETTING-UP SMALL AND MEDIUM SCALE ENTERPRISES

There are many researches in environmental science that have found out that items, substances and materials discarded or thrown as waste can be used as raw material in small and medium scale enterprises (SMEs). (Ladan, 2011), states that solid waste management and control would involve the communities, the SMEs having the capacity to process and produce integrated environmental technologies. Research in environmental sciences have found out that inorganic materials plastic, bottles, glass, metals that are discarded as waste can be recycled. These materials can serve as raw materials to facilitate the establishment of SMEs that engaged in recycling as a business. This will in turn provide employment to many people especially in the urban centers. According to Ikuforiji (2009), in developed countries, the research efforts of Polytechnics and Universities are highly prized and utilized by the industrial corporations towards the establishment of SMEs.

ENHANCED TECHNOLOGY

Researches in environmental science can be made important to national development with improved technology. Presently there are some artisans and enterprises that are engaged in recycling of paper, glass, metals etc in different parts of the country. However, there production is handicapped by inadequate technology to produce quality products in large scale. Today, waste management technology in general and recycling technology in particular, is available mostly to the advanced countries of the world. However, according to (Ladan, 2011), it is vital to guarantee that even the developing countries could promote from all waste supervision technologies. Composting of organic waste into fertilizer also depend on improved technology (biotechnology). This in addition applies to the production of biogas and briquettes from organic wastes. Thus for researchers in these new developments of recycling, composting, production of biogas and briquettes to be of high quality and large scale there is the need for improved technology.

EQUIPPING OF ENVIRONMENTAL SCIENCE LABORATORIES AND CENTERS FOR ENVIRONMENTAL RESEARCH

In Nigeria, there are Environmental Science Laboratories in Universities that offer B.Sc Environmental Science (e.g. Gregory University Uturu in Abia State) and in some State Environmental Protection Agencies (SEPAs). Also in some Polytechnics (e.g.Imo state Polytechnic) there are Centers of Environmental Research and Studies. These laboratories and centers can be fully equipped with the latest up to date equipments in order to facilitate research. This is needed as it has been noted that modern equipment such as Spot P Data Acquisition Satellite, Carbon Monoxide Monitor, Digital Dust Indicator etc. are generally lacking in most of the agencies (Ladan, 2011).

RECOMMENDATIONS

The subsequent recommendations are made in order to make research in environmental science relevant for national development. The Federal and State Government should increase the finances allocated to the institutions of higher learning for research purpose. The managements of the organizations on the other hand should ensure that the funds are not diverted elsewhere. Lecturers, students and other staff of the institutions of higher learning should be properly motivated to carry out researches in environmental science that are relevant to the aspirations of the nation. There should be the provision of encouraging research environment in form of basic research facilities, adequate laboratory equipments, textbooks, journals and other relevant materials. The Federal Government should introduce a comprehensive plan for Research and Development (R&D) in order for the country to be a major force in research and development in the near future. The Federal Government should establish an Institute for Environmental Research and Development (IERD) in one of the states in Northern Nigeria just like the one in Otta, Ogun state. This is important because the north have different environment from the south. The oil companies in the Niger Delta should continue to partner with the universities in the region to conduct researches on the environmental effects of crude oil exploitation. This is with a view to finding lasting solutions to the environmental problems being faced by the region.

CONCLUSION

Research is an important component of national development anywhere in the world. Research unquestionably opens up fresh and well-organized ways of exploiting vast resources of raw nature of man's benefits to guarantee national development. Nigeria as a developing nation has to highlight research to ensure national development. The institutions of advanced learning has for long been engaged in research activities. For example, the Universities in conjunction with NUC use to occasionally organize expositions to display the contributions of the Universities in science and technology through research, training and production/fabrication. These inventions must be acknowledged, collated, original and cosseted for commercialization by industrialists for national development. Researches in environmental science are essentially significant for environmental supervision in order to guarantee clean environment, conserve resources, control pollution, fight climate change, and encourage ecotourism and wise use of our environment. All these are required steps that must be followed for national development.

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